VI.

Extract from a Report on the Natural Oak Forests of Sussex, by T. W. Webber, late of the Forest Department, India.

Natural Oak Forest. — The portions of Hants, Kent, Surrey, and Sussex, known as the "Weald," lying between the chalk hills of the South Downs and the northern chalk formations, was apparently at one time a dense oak forest. The soil, which is a stiff yellow clay, called Weald clay, in places alternating with Hastings sand, stretching from Ashford, in Kent, almost to the New Forest in Hants, seems to be the natural habitat of the English oak, *Quercus Robur var. pedunculata*. Seedling oaks spring up readily, and it seems probable that, if cultivation ceased, forest would gradually take possession of the soil. So rapidly and luxuriantly does the oak grow, that it keeps a firm hold of all banks and hedge-rows where the plough cannot disturb it, and where the farmer is not allowed to cut it, and any waste strips too rough for tillage have only to be enclosed to spring up into oak-wood. The landlord sometimes receives as much annually from the timber cut in the hedge-rows, as he gets from the rent of the land.

Management of Oak-woods.—This is done partly on the coppice principle. The young self-sown plants are permitted to grow as thickly as they will with the copse shoots for ten years. Every ten years the underwood is cut, and "tellers," or young seedling oaks, are left standing at equal distances about 10 feet apart. Where seedlings are not found, copse shoots are chosen, which have grown from small standards, not from old and decayed stools. These are in some places preferred to seedlings, as they grow quicker and are found to reach the age of 90 or 100 years with as sound a butt and as straight a stem as need be desired. There is, however, always a curled and suspicious look about the grain of these trees when cross-cut close to the ground; but this does not extend up the butt. For older growth than 100 years, seedling oaks are preferred. At each decennial copsing, the tellers are looked after, thinned out when required, and gaps filled in from the younger growth. The thinning is gradual, the rule being always to leave the best with a view to the final crop, which is cal-

culated at 40 oaks per acre. The mature age is estimated at 100 years, but this is rather a traditional than an actual estimate, and it is the practice apparently to leave oaks to stand much longer.

Rule for Thinning.—The rule for thinning is to cut those stems which show symptoms of standing still in their growth, and to leave those which are improving. In 50 or 60 years' old wood, the standards are generally found 80 to 100 per acre. In a copse-wood at Heartswood, Sussex, grown from the natural-sprung seedlings, the standards were about 90 per acre. I measured some 4 feet 6 inches in girth, and the smallest measured 2 feet; they contained from 10 to 20 cubic feet. These oaks were straight and well grown, with leafy heads, and covered the ground very evenly. I was informed that this land was a rough meadow, on which hay was made as late as 1810. The only step taken had been to enclose it, when the oaks sprung of themselves, a regular thicket mixed with hazel and a few birch. By careful management it was brought to its present thriving condition.

Method of Cutting "by Groups."—The method of cutting is similar to the German "group culture." The forest, when arrived at maturity, is not quite cleared away; it is rather cut in small patches of 1½ acres to 1 acre each; these patches are cut clean, with a view to an even crop of coppice and seedlings succeeding. The surrounding forest supplies seed and shelter. In no case are single trees selected to be cut in the forest. This would be followed by most disastrous results:—*first*, such a system leads to a fallacious estimate of the crop. The good trees would be sure to disappear, and in time, the owner, imagining he had still so many acres of standing forest, would some day find he had only so many acres of rubbish, while no fresh crop had come in its place, owing to the day-light being excluded, as it soon is, in the gaps, by branches closing in overhead. *Secondly*, old oaks which have long stood together sheltering one another without crushing, are found to be so necessary to one another's existence, that when one is cut, the others assume a stag-headed, scald appearance, and die, or at least cease to thrive. It is necessary, therefore, to take the whole group, or nothing at all, being careful not to expose another neighbouring group to the prevailing wind.

Natural Edges to Groups followed.—And even when the exposed side is not towards the wind, care must be taken to adopt the natural subdivisions of the forest, and cut only up

to a point where the foliage of the trees may happen to feather down to the ground, forming a protection to the outside stems. In no case must the cutting abruptly cease where the stems left are bare and unprotected from the blast, else they will certainly die, or be so checked, that they will cease to improve. Care must also be taken, for the same reason, when cutting the hedge-row oaks, never to cut one of two sister oaks which have long stood together. Either both must be cut, or neither. This system of cutting in groups is very old in Sussex, and has proved itself the most successful one. It seems suitable to natural forest in India, and its maxims are very applicable.

Pruning entirely deprecated.—Here the branches of oak trees are never cut or pruned in any way. It is considered that the damage caused by letting in the air to the heart of the stem is most injurious to the timber. The proprietors have, from long experience, followed the plan of leaving nature alone, and letting trees shed their superfluous branches by the natural way, and certainly the result seems good; for the stems are very clean, exhibit no marks of mutilation, and the timber is sound. This question is distinct from the question of how trees should be trained to grow with one leading shoot and as few side-branches as possible. In Germany the side branches are not allowed to come, the trees being grown purposely crowded together while young. In forests where pruning is approved of, the side branches are cut off; but in Sussex, the side branches are permitted to grow. The branch wood, when the arms of old oaks are large, is useful for knees and curved ribs for ship-building. Therefore, the oaks, especially those in hedge-rows, are allowed to produce spreading heads, and in the coppice woods, more or less of a branching top is approved of. The side branches lower down the stem, as the tree gets older, get shaded by the upper branches and die; they dry up gradually and drop off, the bark closing over the place of insertion on the stem by a slow process, which seems to leave no bad effects behind.

Forest Surveying and Valuation.—The timber standing on estates has to be valued for succession duty, on the succession of every hereditary owner, and a very large staff of surveyors and valuators are constantly employed in this duty. The system adopted is one of "*actual measurement*" of every stem in parks, and "*calculation of average*" in young plantations. The surveyor uses a leather strap, weighted at one end, and marked in quarter girth marks of 4 inches each; with this he proceeds from tree to tree,

throwing his strap round each breast-high, and marking in his book the contents of each from tables, the height being measured with a rod to the first branch, and the arms, if any, computed separately; great care and practice is necessary, and constant testing of the result with trees felled; as a little error makes a vast difference in the contents of trees; averages taken in plantations of unequal growth are often fallacious, except in young plantings; therefore actual measurement is aways preferred.

Copse Woods for Hop-poles.—There is a very large area of pure copse-wood in these counties grown for hop-poles. The principal hop-pole district lies between Godalming and Tenterton, comprising the Surrey Hills, which are almost a continuous forest. Spanish chestnut is principally used, and also ash, larch, oak, and other trees. The chestnuts and oaks are planted at 4 feet apart, and cut down every 10 years. In this system of coppice no high wood or large trees are grown. It is pure copse wood; besides the hop-poles there is a yield as in copse and high wood of smaller stuff, hazels, oak shoots, ash, birch, &c. They are about one inch thick, and split up for hoops for sugar and other barrels. There is a large demand for this hooping, which is exported to the West Indies and other places.

Natural Beech Forests of Buckinghamshire.— In Buckinghamshire, on the chalk hills the oak is not the natural timber, but the beech takes its place and springs just as freely, and without artificial means, as the oak does in the stiff clay. The system is one of selection. The rule is to cut the *best trees*, but there is a regular rotation. The mature age of the beech is considered to be 30 to 50 years only; the timber is used for chair-making. There is a great manufacture, by hand principally, of kitchen and barrack chairs; the chair-makers have great skill in this work, and can do it at so low a cost that they almost monopolise a very large trade, and export chairs to all parts of the world. The beech woods of Buckinghamshire are considerable, and supply this manufacture at a fair profit.